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(56) Documents cited
GB 1484282
GB 1214837
GB 1203403
GB 1184790
GB 1143926
GB 0994809
GB 0826578

(58) Field of search
B8P

(54) Containers for freezing perishable products

(57) Containers 6 for products intended for freezing are stackable and so configured as to provide air-flow spaces between the base of an upper and a lid of a lower container. Containers 6 of different sizes based on a single modular unit may form a single stack.

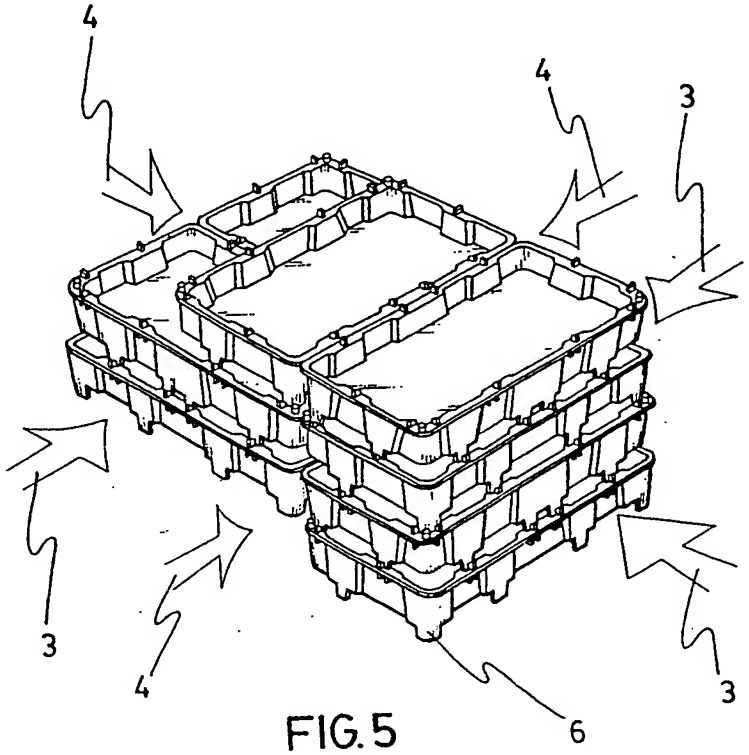

FIG. 5

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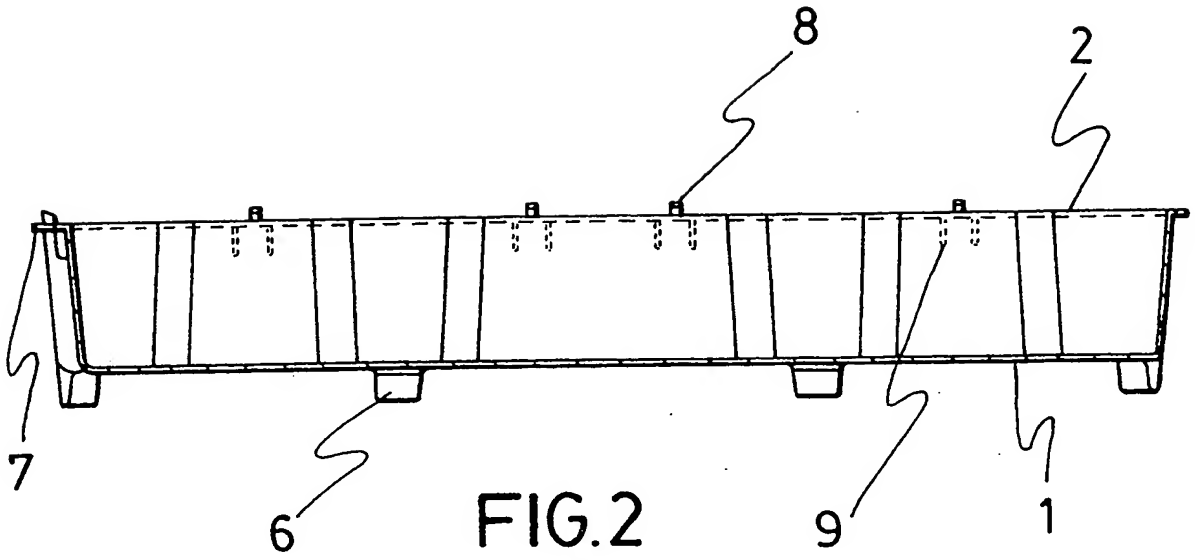

FIG.2

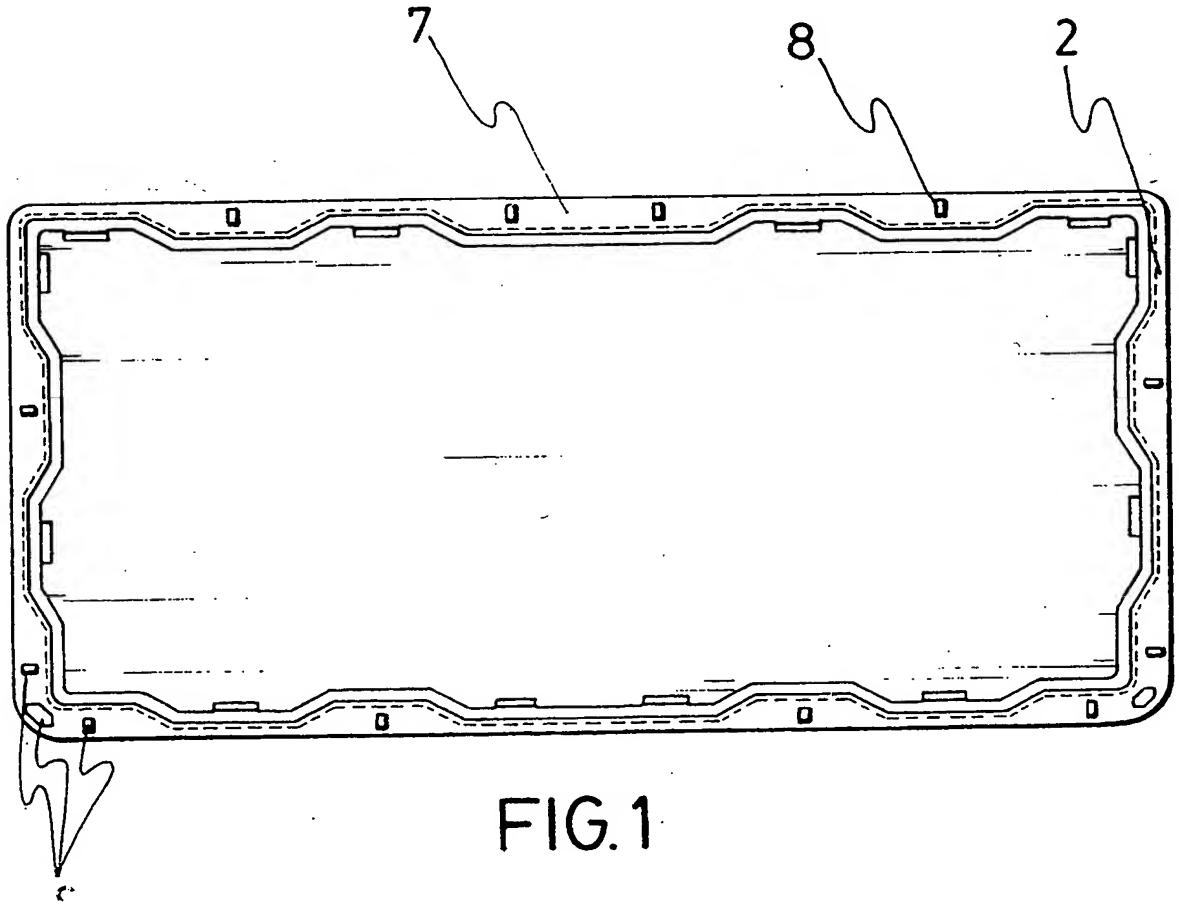

FIG.1

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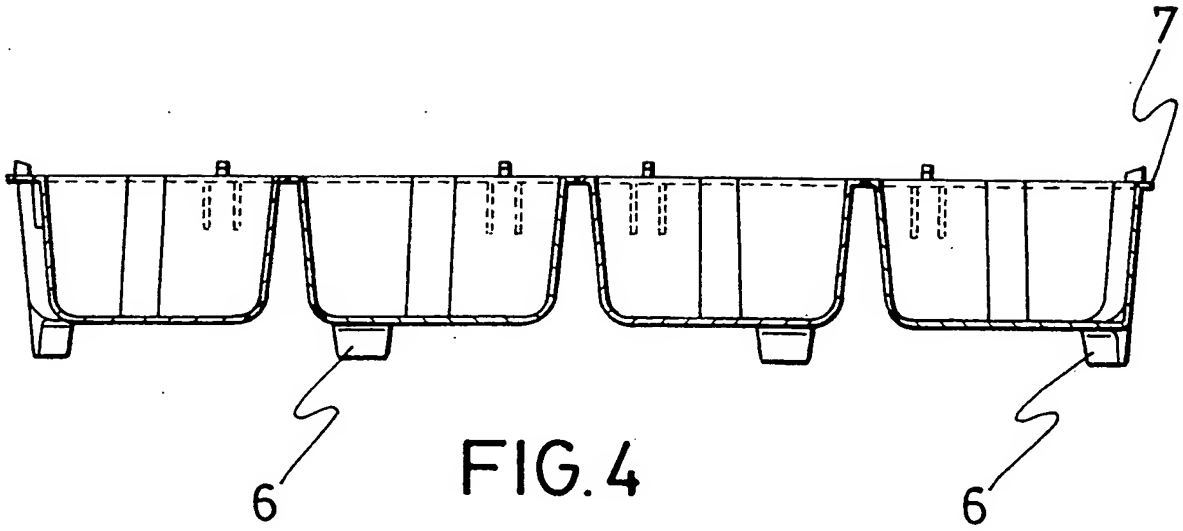

FIG. 4

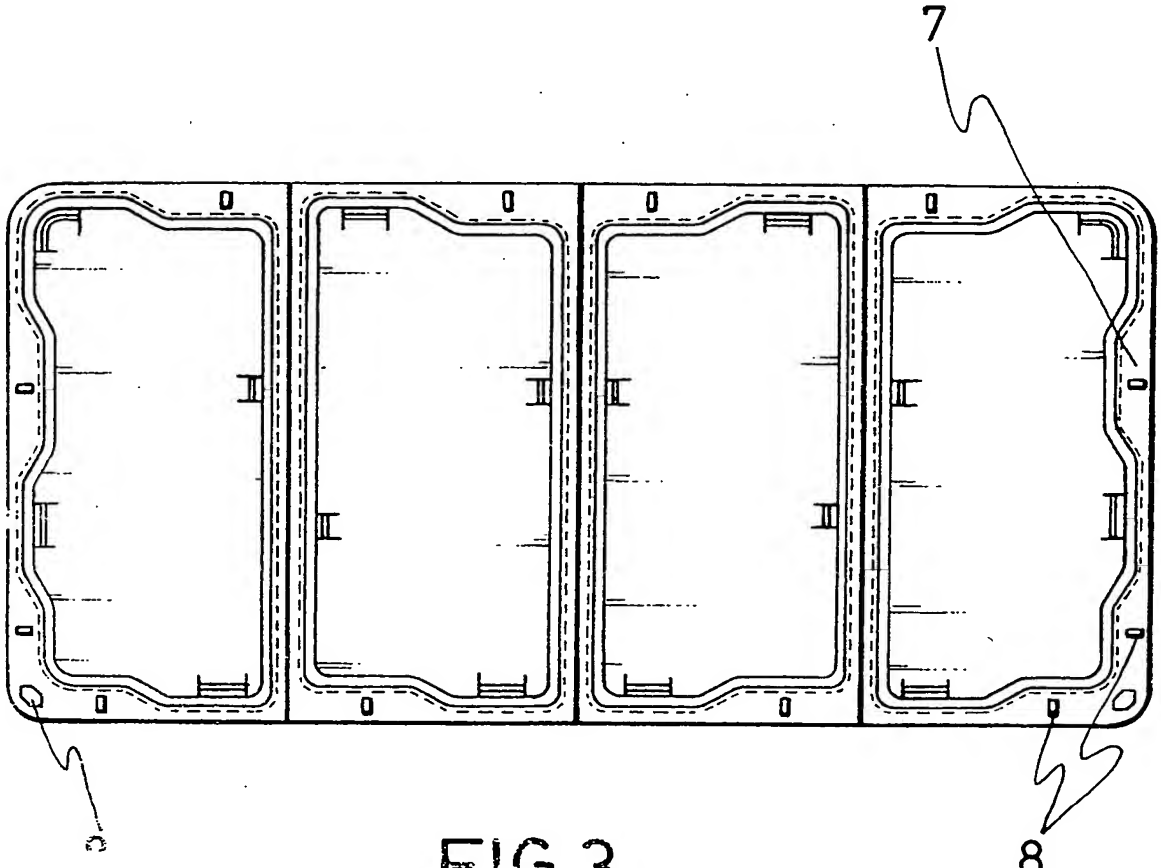

FIG. 3

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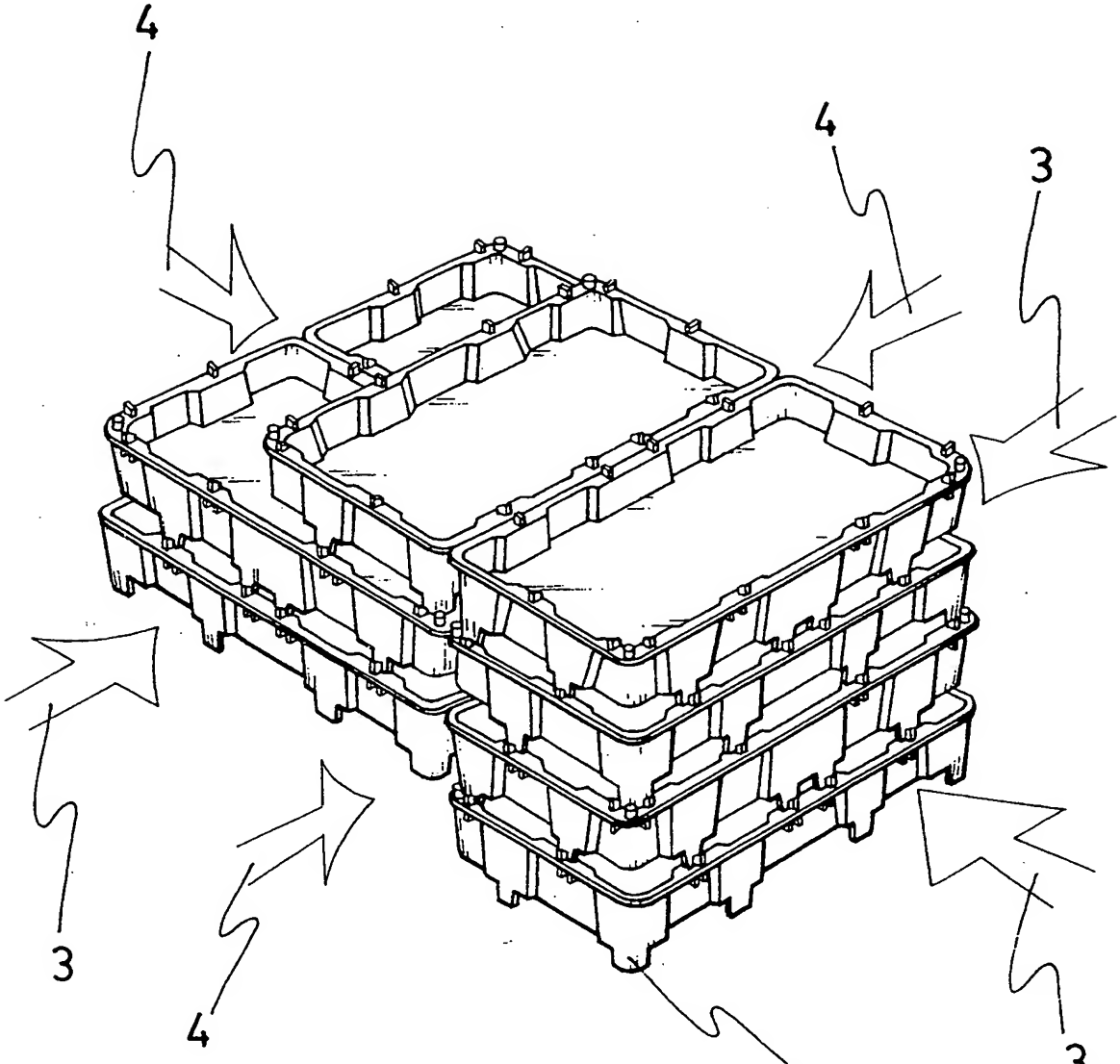

FIG. 5

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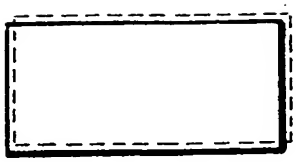

FIG.6

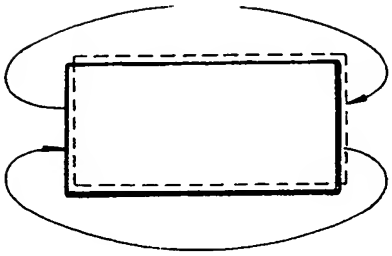

FIG.7

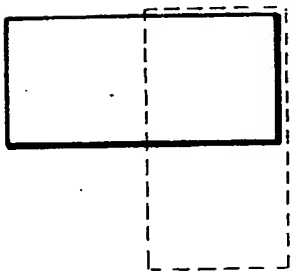

FIG.8

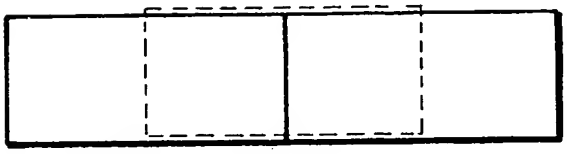

FIG.9

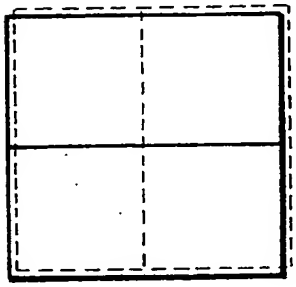

FIG.10

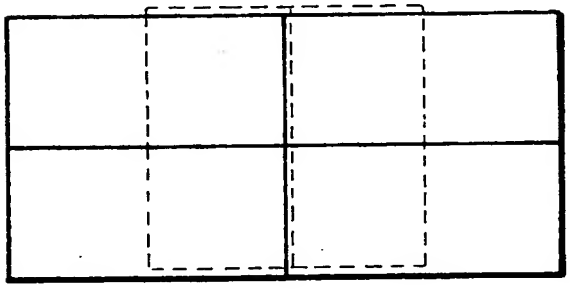

FIG.11

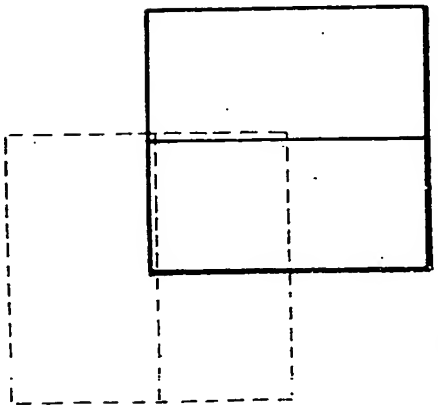

FIG.12

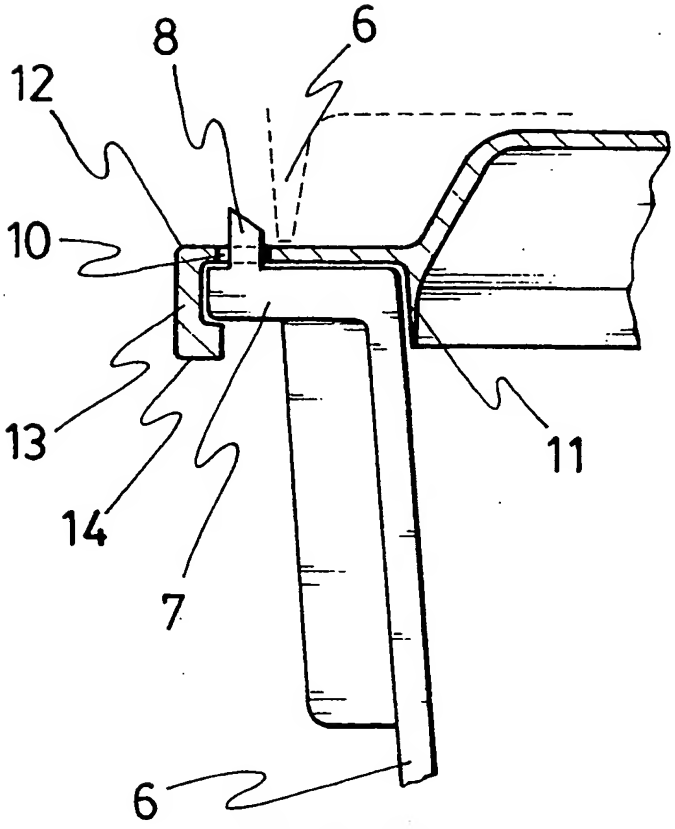

FIG.13

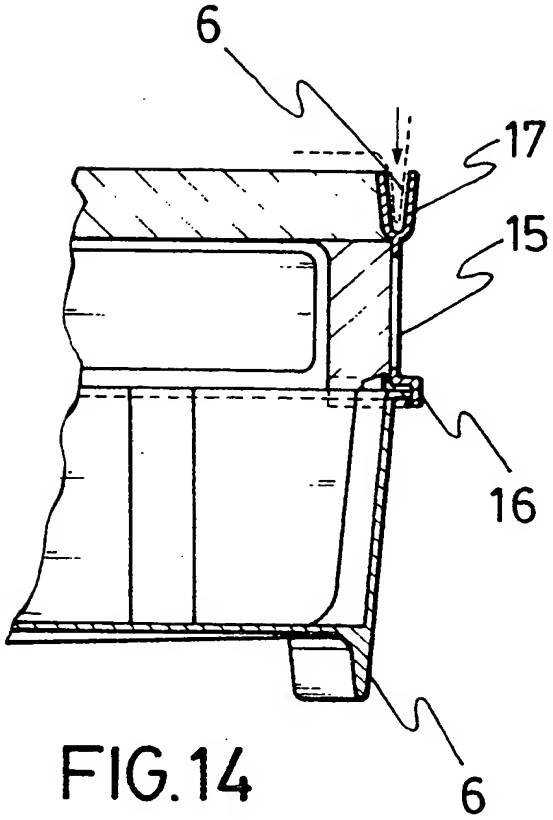

FIG.14

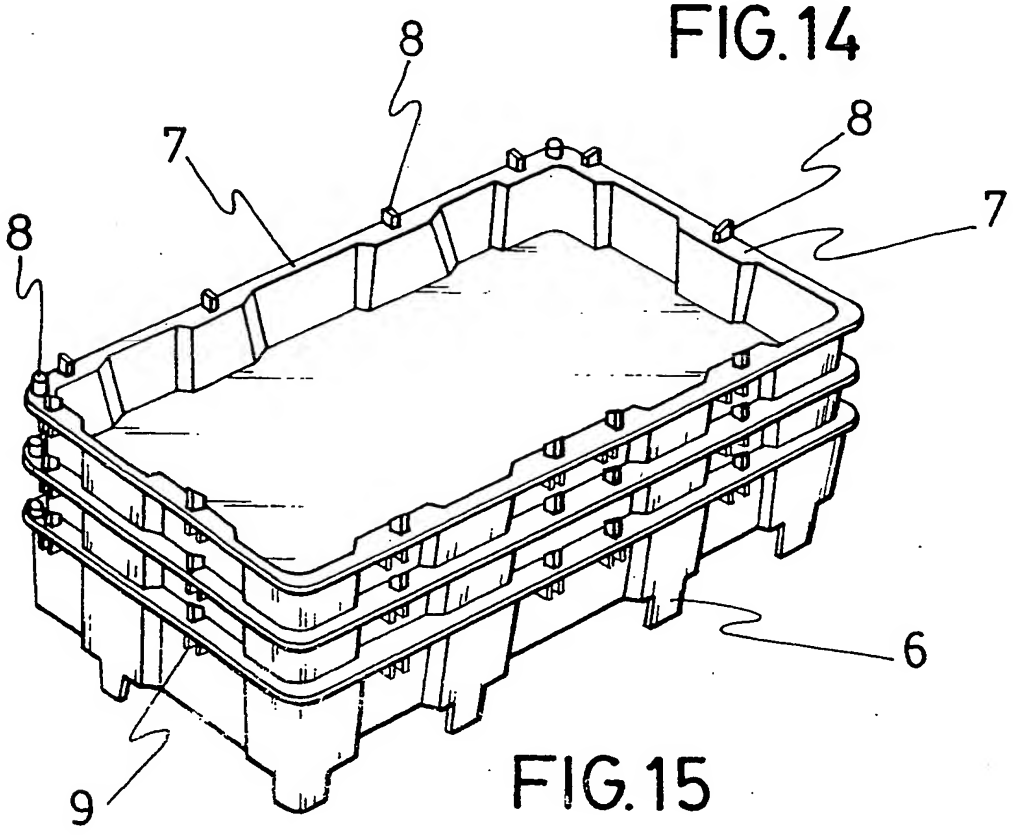

FIG.15

SPECIFICATION

Improvements introduced in containers for freezing perishable products

The present invention refers to improvements in containers for freezing perishable products by means of which the weakest point of a cold-storage plant is solved.

It is a known fact that freezing must take place immediately after capturing and/or slaughtering the animals or harvesting the vegetables. In any case the product must be isolated and protected in a container which permits it to reach the consumer undamaged. However, this is not always the case and the product is perished before reaching the selling place and even at the selling place since it lacks an effective protection because the container does not comply with the purpose for which it has been designed.

Currently rigid, flexible and composite containers are used. The most popular is the flexible container comprising a bag made from plastic material in which the product is heaped and which is basically used for frozen vegetables. The rigid container is generally comprised of a carton box including a thermomolded tray, which is frequently not even included, on which the product is grouped and which is mainly used for fish, shellfish, seafood, etc. The composite container comprises a tray made of expanded material including a retractable wrapper and which is frequently used for frozen meats or for refrigerated products in general.

In the majority of these cases, the product is frozen in an unpacked state, exposing such product to a cold blast of air below −30 or −40°C, wherefore the product is dehydrated, reducing the weight thereof in 2.5 to 3.5%, with the consequent economical loss. Besides, freezing does not take place uniformly since the action of the cold is irregular inasmuch as the product is placed in a disorderly fashion, frequently giving rise to losses in proteins and vitamins due to the unavoidable formation of ice crystals.

If the product is frozen in bags, dehydration is prevented but not the formation of ice crystals as a result of the condensation of the inside air and of the stacking of its contents (in the case of vegetables, for example).

If the product is frozen on trays made of expanded material, the thermoinsulating action of the material becomes manifest and freezing takes place in an irregular manner.

In any of the mentioned cases, freezing takes place slowly and with difficulty. This slowness occasions a longer consumption of time and a higher consumption of energy, but it does not prevent the phenomena of oxidation, reduction in weight, and formation of crystals which deceive the consumer, destroying nutitious substances of the foodstuffs.

Thus, although the cold storage plant is perfectly organized from the site at which the product to be frozen is harvested, captured and cut to the selling points and even to the consumer's home, this cold storage plant still has a weak point: the container. No theoretical or practical means directed to overcome the problem posed by the container for frozen products are known.

Other sectors of the food industry have discovered new composite materials, such as the multilayer containers used for packing milk, wine or other liquids, but in the cold storage sector advances other than those of mere adaptation have not been made.

The invention refers to improvements resulting from a systematic study of the need to freeze, refrigerate and preserve foodstuffs in general, which proportion a container system which maintains the hydration of the product, prevents its oxidation, does not permit the formation of ice crystals, and favours a rapid cooling.

Furthermore, the improvements permit the rapid packaging and stowing of the products for freezing, transportation and storage, the product remaining undamaged until it is to be cooked in the consumer's home.

In accordance with the foregoing, the packaging system of the present invention has a modular constitution, permitting minimum capacities for individual portions to be reached and maximum capacities which always fit into a domestic freezer, so that the content is always protected by the container in which it is placed.

The modular constitution together with a self-stacking system permit the formation of pelletizable loads which facilitate handling, transportation and storage by mechanical means, wherefore operative costs become less expensive and the product-container binomial is optimized.

Since autostacking implies adding to its own load that of other containers, the containers have been proportioned with the necessary resistance, wherefore, depending on the material to be used due to the freezing temperatures to which the container will be subjected, the sizing and stiffening accompany a careful design.

Another factor which has been taken into consideration is that of reducing transportation and storage volume when empty. This is solved with an assymetric design, based on other known experiences, which permit a container to be placed inside another, reducing to the utmost the height occupied thereby.

All these characteristics constitute and define the improvements to be described which proportion a container providing unique services, maintaining a reasonable cost which, added to the product, still renders it competitive with other products packed conventionally.

On the other hand, the conditions to be complied with by the improvements of this invention, do not contemplate the possibility of the retailer removing the product from its container at the time of selling it, in the event the container must be returned upon refunding the money, since the real aim lies in a non-returnable container for logical and hygienic reasons. Thus, the container can subsequently be used by the consumer in a truly practical way. Therefore, two possibilities are ini-

tially contemplated: the container can be converted into a sealed container for subsequent uses by means of a cover; its mechanical characteristics can be utilised to convert it, by means of complementary spacing frames, into racks or internally accessible container structures in which food products, which can perfectly be placed and easily reached, can be stored.

These possibilities of utilising the container perfectly absorb the cost of the wasted material and prevent undesirable plans for the return of the container.

All the described possibilities and the outlined characteristics are merely complementary of others constituting the basis of the improvements of the present invention, since it must be pointed out that although the purpose of the container is mainly to protect the product, it must facilitate, optimize and cheapen freezing of the product contained therein.

In short, the invention consists in determining between the bottom of one container and the opening of the other container receiving it, when both containers contain a product, a free cold flow tunnel which produces the homogenous isothermal action about the entire container, including the cover or sealing of its opening, the containers determining a modular system in which the unit is longitudinally a multiple of the subunits and in which the wall height is a multiple of the wall height of said subunits, a section of the free cold flow tunnel being maintained proportional to the volume contained in the container.

At the bottom of each of the units or subunits there are spacing bases which, in an operative position of the unit or subunit, rest on self-centering seats located in a support wing protruding from the opening of the container, determining between each stacking level a cold flow tunnel which is coplanar with the other cold flow tunnels of other stacking assemblies.

Thus, the described characteristics will be represented in the accompanying drawings which are described by way of example, without limiting the scope of the invention.

Figure 1 represents a plan view of a container, whilst

Figure 2 represents an elevational view thereof.

Figures 3 and *4* represent a plan and elevational view, respectively, of an assembly of four module submultiples which can be positioned permitting the content to be fractioned without having to remove the protecting layer.

Figure 5 illustrates a stacking of containers, the penetration lines indicating the freezing current and representing one of the possibilities of forming a stable pile.

Figures 6 and *7* schematically illustrate how a pile is obtained for storing and/or transporting empty containers, one container fitting partially into another.

Figures 8 and *9* schematically represent two forms of obtaining a pile, the container containing a product and its opening being sealed.

Figures 10, 11 and *12* represent different modes of arranging various piles in a freezer or a preserving chamber.

Figure 13 illustrates the arrangement of a cover on a re-used container, still maintaining the stacking capacity.

Figure 14 illustrates a stacking of containers with the help of separators, constituting a conventional domestic classifying container.

Finally *Figure 15* represents a perspective view of the arrangement of the containers according to Figures 6 and 7, to obtain a reduction in storage and/or transportation volume, awaiting filling.

With reference to the drawings and in accordance with the foregoing, the improvements consist in determining between the bottom 1 of the container and the opening 2 of the other which receives it, when both containers contain a product, a free cold flow tunnel 3 which produces the homogenous isothermal action about the entire container, that is sides and front 4, including the cover 5 or the sealing of the opening.

The containers constitute, as can be seen from Figures 5 and 8 to 12, a modular system in which the unit is longitudinally (Figures 3 and 4) a multiple of the subunits. The wall height of one unit (Figures 1 and 2) is a multiple of the wall height of the subunits, to maintain the section of the free cold flow tunnels 3 and 4 proportional of the volume contained in the container.

For such purpose, at the bottom of each unit or subunit there are separating bases 6 which, in an operative position of the unit or subunit, rest on self-centering seats located in a support wing 7 which protrudes from the opening of the container, determining between each stacking level, the cold flow tunnels 4 which are coplanar with the cold flow tunnels of other stacking assemblies so that, as illustrated in the perspective view of Figure 5, the stacked containers from a battery through which, like a radiator panel, the cold air passes deducting temperature from the containers and their contents.

The self-centering seat for the separating bases 6 is comprised of projecting walls 8 which protrude from the wing 7 of the containers and constitute a unitary or subunitary module.

Below the projecting walls 8 there are reinforcing ribs 9 which distribute the load throughout the entire structure and reinforce it.

The covers 5, facilitating the alternative posterior use of the container once the content has been removed therefrom, have openings 10 which open the passage for the walls 8.

Said covers fit onto the contour of the container, wherefore they incorporate a lip 11, thereby causing sealing. The possibility of providing the containers with this cover from the start has also been contemplated and, therefore, they also incorporate a wing 12 whose edge 13 is folded forming a nipping skirt 14 permitting the contents to be sealed too.

As previously mentioned, the closure is sealed through the lip 11 comprised of a flexible wall which, emerging from the cover 5, fits into the container which, as illustrated in the drawings, has walls divergent towards the opening, whilst the

flexible wall of the cover is convergent.

The other alternative use of the container is derived from the separators 15 which separate the containers from each other, and determines an inlet above the height of the container wall.

The separators 15 are comprised of a frame having side and posterior walls prolonged, by means of gripping clips 16, to the wing of a base unit or two base subunits. The frame is likewise provided with housings 17 in which the separating bases 6 fit.

Although Figures 3 and 4 illustrate four subunits forming one unit, subunits forming a half unit are also contemplated. Thus, the length of the unit is double its width, so that maintaining this width the length of each subunit is proportional to the submultiple and using this as the length of a container, it will be one-eighth of that taken as a unit. The total heights are variable in three multiple dimensions between one another.

For safety reasons, at low temperatures the container and its cover are made from high density polyethylene and the sealing sheet, when the cover is removed, is made from a two-sheet material, the first of which is of polyethylene, facilitating welding, whilst the second is of polyamine to constitute an anti-tearing cover.

CLAIMS

1. Improvements introduced in containers for freezing perishable products wherein freezing takes place at the time of capturing the animals or harvesting the vegetables, which containers can be stacked, depending on the use or storage thereof, characterised by determining between the bottom of one container and the opening of the other which receives it, when both containers contain a product, a free fold flow tunnel which produces the homogenous isothermal action about the entire container including the cover or the sealing of its opening, said containers constituting a modular system in which the unit is longitudinally a multiple of the subunits and in which the wall height is a multiple of the wall height of said subunit, a section of the free cold flow tunnel being maintained proportional to the volume contained in the container.

2. Improvements introduced in containers for freezing perishable products according to claim 1, characterised in that the bottom of each one of the units or subunits is provided with separating bases which, when the unit or subunit is in use, rest on selfcentering seats located at a support wing protruding fjrom the opening of the container, determining between each stacking level a cold flow tunnel which is coplanar with the cold flow tunnels of other stacking assemblies.

3. Improvements introduced in containers for freezing perishable products according to the preceding claims, characterised in that the self-centering seat for the separating bases is comprised of projecting walls which protrude from the edge of the container wing and which are freed by openings in covers which fit on the contour of the container. and which, by means of a wing whose edge folds on a nipping skirt, are seated and retained in the container wing, producing the sealing of the closure by means of a flexible, peripheral wall which, emerging from the cover, fits into the container which has divergent walls whilst the flexible wall has convergent walls.

4. Improvements introduced in containers for freezing perishable products according to the preceding claims, characterised in that an auxiliary element is incorporated for units and subunits for a complementary use, which is comprised of a separator between containers which space them apart and determines an inlet above the height of the container wall and which comprises a frame having prolonged lateral and posterior walls fixed by means of gripping clips to the wing of a base unit or two base subunits, which frame is provided with housings in which the separating bases of one unit or two upper subunits are blocked.

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